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ABSTRACT

The purposes of this study were to (1) describe the performance of Louisiana's prospective teachers on the Common Examinations of the National Teacher Examinations (NTE) in relation to national averages, and (2) determine strengths and weaknesses in the test performance of Louisiana's prospective teachers. Prospective teachers in Louisiana were shown to perform above the national average on the Weighted Common Examinations Total of the NTE. Performance on the Professional Education, Written English Expression and Literature, Fine Arts, and Social Studies subdivisions also compared favorably with national results, and Louisiana's prospective teachers significantly exceeded national averages in Professional Education. A deficiency in concepts and skills in the science and mathematics content areas was found to result from weaknesses in science preparation. The discriminatory ability of scores, the effects of the number of test items, and the difficulty level of the subdivisions are discussed. The scoring procedures and comparisons are described with statistical data indicating levels of strengths and weaknesses. (Author/CM)

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A Study of Selected Variables Involved in the Assessment of Teacher Proficiency

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A Study of Selected Variables Involved in the Assessment of Teacher Proficiency

The controversy surrounding the issue of use of the NTE as a criterion for teacher selection or for teacher certification has stimulated a variety of research investigations. Several studies have investigated the relationship between scores on the NTE and teacher success, grade-point-average, and success in student teaching (Ayers, 1974; Leavitt, 1975; Thayer, 1964). Results of these studies have been inconclusive and conflicting. For example, Andrews' study of the relationship between prospective teachers' NTE scores and their performance in student teaching found no correlation between these two variables (Andrews, 1980). However, Shea's investigation (1955) of the best predictors of classroom teaching success found that the two best predictors of teacher success, as measured by the M-Blank, were undergraduate grade-point-average and teacher scores on the NTE. Other studies have consistently shown a strong relationship between NTE scores and grade-point-averages (whether in major field or overall) (Lins, 1946; Quirk, 1973). A recent North Carolina study (1980) investigating factors which contribute to student achievement found that among the policy controllable variables, teacher quality, as measured by the NTE, was the single most important predictor of student achievement.

Previous research, however, has not focused on attempts to investigate the performance of prospective teachers on the NTE. This study used the scores of 1,352 prospective Louisiana teachers who had taken the NTE in February, 1979. With the cooperation of the Louisiana State Department of Education, scores of examinees were secured from Educational

Testing Service (ETS) for all prospective Louisiana teachers who had taken the examination on the date specified. Without identifying either individuals or institutions, ETS supplied total scores and subscores for all Louisiana examinees on the Common Examinations of the NTE. ETS also provided national average scores for the Common Examinations, as well as national average scores for each subtest of the Common Examinations.

The NTE Common Examinations consist of the following four subtests: (1) Professional Education; (2) Written English Expression; (3) Literature, Fine Arts, and Social Studies; and (4) Science and Mathematics. Scores provided on the Common Examinations are for each subtest, as well as a Weighted Common Examinations Total. Using both national and state scores on the same form of the Common Examinations, this study accomplished two basic purposes. First, the study described the performance of Louisiana's prospective teachers on the Common Examinations of the NTE and compared this performance with national averages. Second, the research explored responses of Louisiana's examinees on the Common Examinations to determine areas of strengths and weaknesses in test performance.

Description of Louisiana's Prospective Teachers' Performance

Using responses of Louisiana's prospective teachers, means (average scores) were produced for each subtest and for the total Common Examinations (WCET), as indicated in Table 1 in the Appendix. Weighted mean scores for Louisiana examinees (N=1,352) were as follows: Professional Education, 238.48; Written English Expression, 59.57; Literature, Fine Arts, and Social Studies, 143.14; Science and Mathematics, 121.16; and Weighted Common Examinations Total, 562.35. National Scores (N=74,223) provided by ETS were as follows: Professional Education, 222.00; Written English Expression, 55.80; Literature, Fine Arts, and Social Studies, 136.75; Science and Mathematics, 141.75; and Weighted Common Examinations Total,

556.30. Figure 1 in the Appendix visually depicts these results. Louisiana's examinees' scores were higher than national scores in all areas except Science and Mathematics.

Average scores for Louisiana and for the nation were compared statistically to determine if the performance of the two groups were actually different or if such score changes could have occurred by chance. Results of the analysis, as shown in Table 2, indicated that the performance of Louisiana's prospective teachers exceeded national performance on the subtest Professional Education. The performance of the national group was, however, statistically greater on the subtest Science and Mathematics. On the remaining two subtests (Written English Expression and Literature, Fine Arts, and Social Studies) and on the WCET, Louisiana's examinees performed as well as other examinees nationally.

Strengths and Weaknesses in Test Performance of Louisiana's Prospective Teachers

To determine test areas where Louisiana's prospective teachers were having problems on the Common Examinations of the NTE, discrimination indices and difficulty levels were computed for each test item, content area and subtest of the Common Examinations. Phi coefficients, used as discrimination indices in item analysis, were internally determined in the computer program. Any discrimination index of .40 or higher was determined to be significant at the .05 level. A difficulty index is a measure of hardness of a test item, content area, or subtest. Calculated difficulty indices were grouped into three categories for ease of interpretation: (1) high difficulty; (2) medium difficulty; and (3) low difficulty. High difficulty was a mean difficulty coefficient of less than .40. Medium difficulty was a mean difficulty coefficient of .40 or greater, but less than .60. Low difficulty was a mean difficulty coefficient of .60 or greater. Mean difficulty indices were then grouped into one of these three categories for each of the four subtests in the Common Examinations.

As shown in Table 3, analysis of the data indicated that neither the Professional Education subdivision (mean discrimination index of .3196) nor any of its sixteen content areas discriminated significantly between students in the high group and students in the low group. The discrimination indices ranged from a low of .2366 for the area "Reporting Pupil Progress" to a high of .3750 for "Relationship of Growth and Development to Learning."

The Professional Education (PE) subtest was of medium difficulty, as were 11 of its content areas. The remaining five content areas in this subtest were all of high difficulty. None of the content areas were classified in the low difficulty category.

Analysis of the data in the Written English Expression subdivision indicated that neither the subdivision (mean discrimination index of .3702) nor either of its two content areas discriminated significantly between students in the high group and students in the low group. Discrimination indices ranged from .3674 for the area "Usage" to .3733 for "Sentence Correction."

The Written English Expression (WEE) subtest contained two content areas: (1) Usage and (2) Sentence Correction. The WEE subtest was classified as being of medium difficulty. One of the content areas, Usage, was of medium difficulty. The remaining content area, Sentence Correction, was of high difficulty. Thus, Louisiana's examinees had more trouble with questions on Sentence Correction than with questions on Usage.

Analysis of the data on the Literature, Fine Arts, and Social Studies subdivision indicated that both the Literature (.4173) and Music (.4274) content areas significantly discriminated between the high group and the low group. Neither the Literature, Fine Arts, and Social Studies subdivision as a whole (.3355) nor any of the social studies content areas nor Art (.3978) significantly discriminated. Discrimination

indices for the social studies content areas ranged from a low of .2050 for "Political Science" to a high of .3716 for "Geography."

The subtest Literature, Fine Arts, and Social Studies (LFASS) was divided into nine content areas. Of these nine areas, five were classified as being of high difficulty, as was the entire LFASS subtest. The four remaining subtests were of medium difficulty. Hence, on the LFASS subtest, Louisiana's prospective teachers found most difficult the content areas of Literature, American history, World history, Political science, and Economics.

Analysis of the data for the Science and Mathematics subdivision indicated that the overall Mathematics areas significantly discriminated between the high and low groups. Discrimination indices for the Mathematics content areas ranged from a low of .3498 for "Elementary algebra" to a high of .5070 for "Arithmetic operations." Neither the Science and Mathematics subdivision as a whole (.3840) nor the science content areas significantly discriminated between the high group and the low group. Discrimination indices for the science content areas ranged from a low of .2633 for "Chemistry" to a high of .4390 for "Meteorology."

Items on the Sciency and Mathematics (SM) subtest were divided into ten content areas, six of which dealt with science concepts and four with mathematics concepts. The SM subtest was of medium difficulty, as were six of the content areas. Of the remaining four content areas two (Astronomy and Elementary algebra) were of high difficulty and two (Meteorology and Arithmetic operations) were of low difficulty.

To statistically test if there were a significant differerce in the number of items that discriminated between the high group and the low group among the four subdivisions of the Common Examinations, the mean discrimination indices were converted to nominal level data in terms of whether each item significantly discriminated or did not significantly

discriminate. Analysis of the data, as shown in Table 4, indicated that there was no significant difference in the number of items that discriminated between the high and low group.

To statistically test if there were a significant difference in the number of high difficulty items, medium difficulty items, and low difficulty items among the four subdivisions of the Common Examinations, the difficulty coefficients were converted to nominal level data in terms of the number of items of high difficulty, of medium difficulty, and of low difficulty. Analysis of the data, as shown in Table 5, indicated that there was no significant difference in the number of items of high, medium, and low difficulty.

Conclusions

The following conclusions are drawn as a result of the analysis and presentation of data relative to the research questions posed in this investigation of the performance of Louisiana's potential teachers on the Common Examinations of the National Teacher Examinations (NTE):

1. The performance of Louisiana's potential teachers on the Weighted Common Examinations Total of the NTE compares favorably with the national performance.

2. The performance of Louisiana' students on the Professional Education, Written English Expression, and Literature, Fine Arts, and Social Studies subdivisions compares favorably with the national performance. Louisiana's students' performance on the Professional Education subdivision significantly exceeds the national average performance on that subdivision of the Common Examinations.

3. Louisiana's students show a deficiency in concepts and skills measured by the Science and Mathematics content areas of the NTE Common Examinations when compared to national norms. This deficiency is a result of a deficiency in Science preparation rather than a deficiency in Mathmatics preparation.

4. The NTE Common Examinations does not effectively discriminate for Louisiana's examinees in the four subdivisions of the Common Examinations.

5. Neither the Professional Education or Written English Expression subdivisions nor any of their content areas differentiate between potential teachers with high test scores and those with low test scores.

6. The subdivision Literature, Fine Arts, and Social Studies does not differentiate between potential teachers with high test scores and those with low test scores. However, the items in the content areas of Literature and Music are effectively discriminating between high and low test scorers.

7. The subdivision Science and Mathematics does not differentiate between potential teachers with high test scores and those with low test scores. However, the Mathematics content areas are effectively discriminating between high and low test scorers.

8. In the Professional Education subdivision, Louisiana's prospective teachers experience difficulty in responding to items in the content areas concerning history, learning principles, influence of social variables, and organizational patterns.

9. In the Written English Expression subdivision, Louisiana's prospective teachers experience difficulty in responding to items in the content areas concerning Sentence correction.

10. Louisiana's prospective teachers experience difficulty in responding to items in the Literature, Fine Arts, and Social Studies subdivision and in the content areas of Literature, American history, World history, Political science, and Economics.

11. In the Science and Mathematics subdivision, Louisiana's prospective teachers experience difficulty in responding to items in the content areas of Astronomy and Elementary algebra.

12. The number of test items in any subdivision of the Common Examinations does not significantly affect the discriminatory ability of that subdivision.

13. No subdivision of the Common Examinations is significantly more difficult than any other subdivision of the Common Examinations.

14. Level of difficulty of the test items does not significantly affect the discriminatory ability of the test items.

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APPENDIX

Table 1

Summary of 1979 National Mean Scores and Louisiana's Mean Scores on the Common Examinations of the NTE and Its Subdivisions*

Sources of Scores	Number of Examinees	Mean PE Scores	Mean WEE Scores	Mean L, FA, SS Scores	Mean S & M Scores	Mean WCET Scores
National	74,223	222.00	55.80	136.75	141.75	556.30
Louisiana	1,352	238.48	59.57	143.14	121.16	562.35

*Scores reported in Weighted Form

CODE KEY

PE - - - - Professional Education subdivision
WEE - - - Written English Expression subdivision
L, FA, SS- Literature, Fine Arts, & Social Studies subdivision
S & M - - Science & Mathematics subdivision
WCET - - - Weighted Common Examinations Total

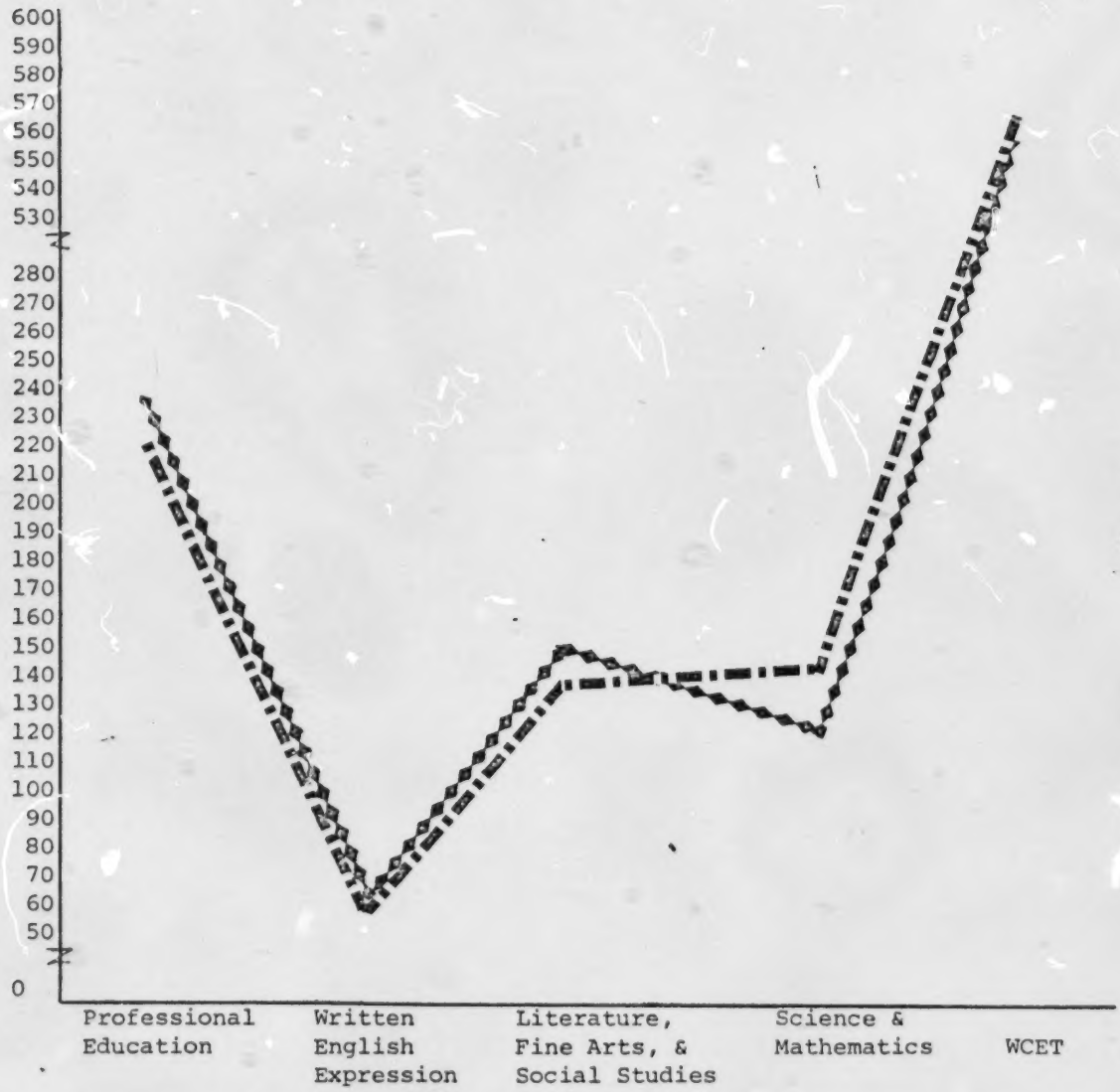

Figure 1

Graphic Depiction of 1979 National Mean Scores and Louisiana's Mean Scores on the Common Examinations of the NTE and Its Subdivisions*

*Scores reported in Weighted Form

▪▪▬▪▬▪National Scores

◆◆◆◆◆◆Louisiana Scores

Table 2

Summary of Means and Z Scores of the 1979 National Scores and 1979 Louisiana Scores on Form K-ANT of the Common Examinations of the NTE and Its Subdivisions*

Content Area	National Mean	Louisiana Mean	Z Score	p**
Professional Education	223.20	238.48	2.52	.05
Written English Expression	56.10	59.57	1.48	n/s
Literature, Fine Arts, and Social Studies	141.00	143.14	.46	n/s
Science and Mathematics	140.25	121.16	-3.72	.0002
WCET	560.55	562.35	1.07	n/s

*Scores reported in Weighted Form

**A z score $\geq$ 1.96 was required for significance at the .05 level.

Table 3

Summary of Number of Items, Discrimination Indices and Difficulty Levels of the Content Areas for the Common Examinations of the NTE

Content Area	No. Test Items	Mean Disc. Index	Level of Diff.
Professional Education Subdivision	110	.3196	Medium
Significant historical events	11	.3165	High
Relationship to societal objectives	10	.2737	Medium
Community and professional relationships	5	.3303	Medium
Relationship of growth and development to learning	6	.3750	Medium
Organizational patterns	6	.3129	High
Principles of learning	6	.3218	High
Social/Cultural impact on learning	5	.3016	High
Social system of classroom	5	.3184	Medium
Theories of teaching	5	.3449	Medium
Controlling behavorial problems	8	.3631	Medium
Approaches to concept and skill development	10	.3559	Medium
Learning principles specifically applied	13	.2812	High
Daily evaluation	4	.3252	Medium
Kinds of tests	7	.3198	Medium
Statistics	6	.3362	Medium
Reporting progress	3	.2366	Medium

Table 3 (continued)

Written English Expression Subdivision	45	.3702	Medium
Usage	25	.3674	Medium
Sentence correction	20	.3733	High
Literature, Fine Arts, and Social Studies Subdivision	65	.3355	High
Literature	20	.4173*	High
Music	6	.4274*	Medium
Art	9	.3978	Medium
American history	5	.2628	High
World history	5	.3419	High
Geography	5	.3716	Medium
Sociology	5	.3235	Medium
Political science	5	.2050	High
Economics	5	.2722	High
Science and Mathematics Subdivision	50	.3840	Medium
Astronomy	2	.3655	High
Biology	8	.3353	Medium
Chemistry	7	.2633	Medium
Geology	3	.3829	Medium
Physics	7	.2926	Medium
Meteorology	3	.4390*	Low
Arithmetic operations	2	.5070*	Low
Simple arithmetic word problems	7	.4162*	Medium
Measurement	5	.4888*	Medium
Elementary algebra	6	.3498	High

*Significant at the .05 level

Table 4

Contingency Table Summary of Analysis of the Number of Discriminatory Items Among the Subdivisions of the Common Examinations of the NTE

Content Area	Number Items: Sign. Disc. O	E	X^2	Not Sign. Disc. O	E	X^2	Total Chi Square	p*
Professional Education	39	44	.57	71	66	.38		
Written English Expression	22	18	.89	23	27	.59		
Literature, Fine Arts, and Social Studies	25	26	.04	40	39	.03		
Science and Mathematics	22	20	.20	28	30	.13		
							2.826	n/s*

*A Chi Square coefficient $\geq$ 7.815, with three degrees of freedom, was required for significance at the .05 level.

Table 5

Contingency Table Summary of Analysis of the Number of High, Medium, and Low Difficulty Items Among the Subdivisions of the Common Examinations of the NTE

Content Area	Number Items									Total Chi Square	p*
	High Diff.			Medium Diff.			Low Diff.				
	O	E	X^2	O	E	X^2	O	E	X^2		
Professional Education	49	50	.02	35	32	.28	26	28	.14		
Written English Expression	22	21	.05	15	13	.31	8	11	.82		
Literature, Fine Arts, and Social Studies	35	30	.83	14	19	1.32	16	16	0		
Science and Mathematics	17	23	1.37	15	15	0	18	12	3.00		
										8.322	n/s*

*A Chi Square coefficient $\geq$ 12.592, with six degrees of freedom, was required for significance at the .05 level.